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ABSTRACT

The establishment of the first documentation center in a library school early in 1955 by Jesse Shera, Dean of the Library School at Western Reserve University, has been widely interpreted as his greatest contribution to librarianship. It may have been his greatest folly, however, because information science has subsequently flooded the library profession with tensions and confusion by (1) emphasizing the technical aspect of communication systems and (2) ignoring the human aspects of communication per se. Shera criticizes information science for its take-over mentality (it must not be allowed to rule the library roost) and for its failure to distinguish data systems (for the transmission and reception of signals) from idea systems (for the intersubjective communication of thought). He also bids librarianship to investigate Symbolic Interactionism as an alternative to Systems Theory, because the former attempts to explain how a mind is put in touch with other minds through the communication of ideas, whereas the latter concentrates on the controlled manipulation of physical data, e.g., electrical impulses, alphabetic characters, and speech sounds. (An extensive list of notes is provided.) (Author/THC)

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SHERA AS A BRIDGE OVER TROUBLED WATERS

BY

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Jesse Shera's establishment of the first documentation center in a library school has been widely interpreted as his greatest contribution to librarianship. It may have been his greatest folly, however, because information science has subsequently flooded the library profession with tensions and confusion by (1) emphasizing the technical aspect of communication systems and (2) ignoring the human aspects of communication per se. Shera criticizes information science for its take-over mentality (it must not be allowed to rule the library roost) and for its failure to distinguish data systems (for the transmission and reception of signals) from idea systems (for the intersubjective communication of thought). He also bids librarianship to investigate Symbolic Interactionism as an alternative to Systems Theory, because the former attempts to explain how a mind is put in touch with other minds through the communication of ideas, whereas the latter concentrates on the controlled manipulation of physical data (electrical impulses, alphabetic characters, speech sounds, etc.).

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By H. Curtis Wright

> Librarians would do well to remember occasionally [Michaelangelo's] Moses or a Pietà and think somewhat less frequently of Shannon and Weaver.
>
> --Jesse Shera[1]

The Situation at Reserve.--In November, 1952, less than three months after Jesse Shera came to Cleveland as Dean of the Library School at Western Reserve University, he learned that James W. Perry, an important pioneer documentalist, was leaving MIT for the Battelle Memorial Institute (BMI) in Columbus. This move made neighbors of Shera and Perry, more or less, and enabled them to work together occasionally in 1953 on the problems of mechanized information retrieval. In 1954, however, things started falling apart at Battelle; and in the Spring of 1955, Perry told Shera it was all over at Columbus. Shera therefore made arrangements for Perry to interview John S. Millis, President of Western Reserve University, about setting up a documentation center at Reserve. So, Perry came to Cleveland, bringing an associate named Allen Kent with him, for interviews with President Millis. "And before I knew it," says Shera, "I had Perry and Kent on my faculty and a documentation center on my hands."[2]

The documentation center was established early in 1955 as a research division of the library school. By 1956, Shera's coterie of enthusiasts, "all concerned with ... documentation and machine literature searching," were committed to the task of "establishing a new look in librarianship" at Reserve.[3] The American Society for Metals (ASM) had already given the center a grant of $75,000 for research on the use of machine methods for organizing and abstracting metallurgical literature,[4] and Perry was hard at work in Shera's basement building the searching selector he had invented.[5] Perry also managed to interest General Electric in what he was doing, and its engineers then developed the GE 225 general-purpose computer, making "the first one available at nominal cost to the library school."[6] Thus, the first operational system for the mechanized retrieval of information, the first operational computer, appeared in the library school at Reserve, which also became the first library school to ... [incorporate] documentation into its academic program."[7] The initial grant of the ASM then served to attract many other grants, which were paralleled by "a series of national and international conferences, skillfully organized after the model of Shera's practices" at Chicago.[8] These conferences "called attention to the information explosion" in the fifties and "provided a platform for ... public debate on ... the information crisis."[9]

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All of the above contributed mightily to the intensely intellectual atmosphere in Shera's School of Library Science and brought him national and international recognition. The climate in his challenging new world of information retrieval has been described as "elevated and inspiring" by Alan Rees, an unsuspecting student from Ohio State who arrived at Reserve in 1956 to go through library school.[10]

> Expecting conventional training in library techniques, I discovered ... great intellectual vigor, excitement and ... arrogance. Perry and Kent labored in [the documentation center on Magnolia Drive] ... while the library school was located ... [on Bellflower Road]. Trudging between these [two organizations] ... made me wonder as to the relationship between ... [them]--which was the tail and which was the dog....
>
> And so I was plunged into the Shera-Perry-Kent documentation arena.... The atmosphere was exciting and invigorating with much argument to the point of rudeness and insult.... The prevailing feeling ... was one of imminent discovery and concern with prior claims and intellectual authorship."[11]

There were, perhaps, no serpents in Shera's garden. But arrogance, argument, rudeness and insult, concern with prior claims and intellectual authorship--these products of noxious weeds were indeed found among the fruits of his successes. The documentation center was begotten by Shera and born of the library school; but the child soon grew stronger than its parents, threatening to leave home at an early age, and Shera began his prolonged struggle to keep the family together. "He was convinced that if librarianship was to survive as a profession it had to rise above the computer, the systems analyst, and the engineer. At the same time," however, "he did not believe that technological innovation had to be disruptive."[12] The center was originally meant to be a catalyst,[13] an integrating agent whose function was to galvanize unrelated attempts at automation and mechanized literature searching into an interlocked synthetic unity of some sort. Shera was hoping for fusion, in other words. But he got fission instead, because Perry and Kent "had their own ideas."[14] His idea of a hi-tech synthesis "never really took,"[15] therefore, because "Perry had developed his own system, and he was all hell-bent for that and didn't want to work on anything else. And actually, he never did."[16] Perry's system "was a good system,"[17] says Shera. But it was a very far cry from being the <u>only</u> system.

> I mean, we learned an awful lot in working with that thing. But all the attention of [Perry and his staff] ... was focussed on this particular system, which came to be known, much to my unhappiness, really, as <u>the</u> Western Reserve System. And I didn't like it.... Whatever synthesis we had was simply measuring everything else against what Perry had done, and it was [always] inferior, according to Perry.[18]

On February 23, 1961, not long after Perry left Reserve for the University of Arizona, Shera made this revealing public statement:

> Mechanization ... has much to contribute to the [real] solution of the library problem, but with it comes the danger of ... over-simplified solutions and ... panaceas.... Because a particular literature searching device may ... work well in a ... pilot operation, the undiscriminating may see in it the solution to all bibliographic problems.... We do not pretend to have solved

> the information retrieval problem at Western Reserve.... If we have learned anything from our investigations it is that one cannot begin with hardware, with a machine, and work backward to the solution of the problem.[19]

This statement illuminates the complex struggles involving (1) academic altruism and opportunism, (2) professional altruism, and (3) commercial opportunism which occurred at Reserve between 1955 and 1963. The resulting conflict of outlooks may be analyzed as follows:

1. The academic outlook is the intellectual spirit of serious critical inquiry found in competent university professors the world over. It may be humanistic, scientific, or both; it may be altruistic (if it benefits the university as well as the professor) or opportunistic (if it benefits only the professor); and it may or may not include commitment to a specific profession or group of professions.

2. The professional outlook is essentially the academic outlook tempered by an altruistic commitment to the special interests of a specific profession or group of professions.

3. The commercial outlook subordinates academic and professional values (and in its radical forms all values) to the marketing ethic of the salesman, whose operating principle is the maximization of profits. It is predominantly (or wholly) opportunistic: the idea is to buy (or produce) something for as little as possible and sell it for as much as possible.

Shera's interest in the documentation center was essentially professional: his outlook was academic in a fundamentally humanistic sense, and he was thoroughly committed to the improvement of librarianship. He therefore took the user's view of the Searching Selector as an object of scrutiny, not the subjective view assumed by its inventer, and looked at Perry's system (as he looked at all information systems) in terms of (1) the functions it could actually perform and (2) the purposes it might be able to serve by performing its functions; and he evaluated the system by its ability (or inability) to perform the functions and serve the purposes of librarianship. This view, however, seemed restrictive and confining to Perry, "an extremely imaginative person" whose inventive mind was continually combining innovative and original ideas with "a very keen perception of the information problem."[20] Perry, too, was academically minded, but in an almost wholly scientific sense; and like most professors who lack Shera's strong commitment to a profession, he tended to view what he was doing in terms of his own career. This led Shera to observe that self-interested scholars like Bliss, Ranganathan, and Perry, for whom objectivity means criticising everybody else's assumptions, are very proficient when it comes to evaluating other people's systems. "When they develop systems of their own," however, "they just sell their souls to the devil;" and "the minute they start talking about the systems they've devised themselves, they lose this objectivity and are just as blind as anybody else to the weaknesses in their own systems."[21] Nevertheless, says Shera, "Perry made an enormous contribution" to librarianship which must be acknowledged by the profession.[22] He was the foremost contender of the fifties, when documentalists everywhere, driven by the seductive pro-

spect of imminent success, were striving frantically to resolve the problems of mechanized literature searching. "There was cutthroat competition in the field," Shera recalls, "and Perry was right in the thick of it."[23] He was probably not averse to profiting financially from his inventions, although his priorities were so overwhelmingly intellectual that money was virtually excluded from his preoccupations. The promotion of Perry's system was therefore left to Kent, the pragmatic and aggressive Associate Director of the Documentation Center. His commercial ambitions, however, were constantly threatened by Shera, who saw the wealth, the prestige, and the tremendous success of the center "as a shot in the arm for librarianship."[24] But "Perry and Kent, and particularly Kent, dissented from this,"[25] each for his own reasons, and a split developed between the center and the school in which Shera polarized "first with Kent, and then to some extent with Perry."[26] Both Kent and Perry "were convinced that they held the answer to the literature problem" and determined to exploit it, albeit in different ways.[27] The Western Reserve University System "was [accordingly] pronounced a success" and "offered ... to subscribers" without an "extensive evaluation of ... [its] complex intellectual apparatus."[28] This scandalized Shera, who "was concerned with the intellectual foundations of machine systems" generally, whereas "Perry and Kent were intent on advancing, justifying and selling <u>their</u> system."[29] Thus, the original purpose of the center, which was essentially altruistic and professional in character, was being sacrificed to personal concerns of an academic and commercial nature, "and the library school began to fall apart."[30] Kent and Perry were extremely competent people. But the main thrust of their labors, from the moment they arrived at Reserve, "was to propagate a system which they felt to be a major solution to the literature problem."[31] In that regard, says Shera, "the center was a disappointment.... They didn't give a hoot about the rest of the library school."[32] And he adds, therefore, that "it was not until Perry and Kent left that I got ... [the center] to do some of the things I wanted done."[33]

<u>Aftermath and Second Thoughts</u>.--Shera's accomplishments clearly rose to the surface of troubled waters. Documentation was important to him; but he deplored the tendency of the documentation center to become the tail that not only wanted to wag the dog but threatened to devour it. The stormy liaison of the center with the school, moreover, was becoming a microcosm for the similar relations of information science with librarianship generally. Shera was profoundly disturbed by the turbulence of those relationships, and in his last published statement he faults information science for a large part of it. This statement, while severely critical, is far from being a complete repudiation of information science, although it "represents a point of view that is not universally held by librarians ... [or] information scientists."[34] Information science is only the latest of many "attempts to ... [im-

proved library technology,"[35] attempts which can be traced to the beginnings of documentation in Europe. When this movement came to America, the librarians who were interested in microphotography began calling themselves documentalists, for they, too, "had adopted a new technology."[36] There was no change in the nature or in the goals of librarianship; but there was a pronounced change in their condescending attitude toward the other librarians. The breach between librarians and documentalists was beginning to widen, for "librarianship was becoming a tarnished word:" the second wave of documentalists also "wanted to dissociate themselves from it," and the third wave likewise resented the contamination of documentation by librarianship.[37] Librarians have thus become the dopers of information management, and the justification for withdrawing from them is always the adoption of a new technology for improving access to knowledge. The whole case for information science and its antecedents turns on the fulcrum of scientific technology; and "except for some tinkering with its processes," Shera reminds us, "scientific technology has made but little contribution to the development of the library."[38]

Because Shera understood this clearly, he reversed his thinking about information science in centrally significant ways. He knew that no profession can build itself upon its instruments. Technology is important in medicine and engineering, for example. "But in neither of these instances does the [professional] activity derive its essential character from its instruments; the instrument is an incident or an accident" of the critical thinking which controls its use.[39] Shera concluded, therefore, that "information science," insofar as it rests on purely technological foundations, "cannot qualify as a theoretical base for librarianship, and calling it bibliometrics or informatics [or anything else] does not alter the situation."[40]

> Twenty years ago, I thought of what is now called information science as providing the intellectual and theoretical foundations of librarianship, but I am now convinced that I was wrong.... I seriously question whether there is a true interdisciplinary relation between librarianship and information science.... Because librarianship is much more than ... mechanized access to data banks or networks ..., we must look to other disciplines for its interdisciplinary relations and the core of its theory.[41]

In spelling out this significant reversal, Shera draws freely on two of my articles, "Professionalism and the Socratic Paradox" and "The Instrumentality of Data." I have therefore amplified some of his remarks and documented their sources for the sake of clarity in introducing this new way of thinking. Shera realized full well that the organizations, operations, functions, purposes, goals, and services of librarianship are not reducible to machinery. Professionalism, furthermore, is not derived from the expert use of tools. There is more to professional technique than technology, for technique presupposes "skill or efficiency at a particular job, and ... efficiency depends on ... knowledge of the job in hand."[42] Such are the implications of arete, the Greek word wrongly translated as "virtue" in the Socratic paradox that "virtue is knowledge." What Socrates meant by that statement is: "You can't be ef-

ficient unless you take the trouble to learn the job."[43] Professional technique always presupposes a function determined by structure: you can't figure out the best way of doing something unless there is something specific to be done; and what anything can do depends on what it is.[44] The professional worker thinks in terms of his function, not in terms of his tools. He must know three things about the actual work he does for the public: (1) its formal structure, or what the work is, (2) its functional purpose, or what the work is for, and (3) its occupational technique, or the best way of performing the work. Otherwise, according to Socrates, the worker is incompetent. The technique of shoemaking, to use one of his favorite examples, depends on the shoemaker's possession of this knowledge.

> If you want to be a good shoemaker, he said, the first thing necessary is to know what a shoe is and what ... [a shoe] is ... for. It is no use trying to decide on [your shoemaking technique by selecting] the best ... tools and materials to use and the best methods of using them unless you have first formed ... a clear and detailed idea of what it is you are setting out to produce and what function it will have to perform.[45]

What, then, is the "shoe" of that particular "shoemaker" known as a librarian? Shera argues that it is an idea service based on the acquisition, organization, and interpretation of knowledge records.[46] Information science can help with knowledge organization by providing "ways in which the accumulated materials [of knowledge] can be arranged and processed for maximum convenience and efficiency of use;" but, says Shera, "it is here, and only here, that information science makes its contribution to librarianship."[47] Information science, he says, "deals with only a part of what the librarian does;" and therefore, "if librarians persist in sublimating librarianship to the lure of the machine and [to] the all-importance of data retrieval their 'shoes' will be ... uncomfortable to the user, and they will leak at ... vital points."[48]

Shera has always argued for "the essential unity of librarianship with its offspring," which includes "a holistic view of librarianship" itself as well as its historical unity with "special librarianship, documentation, information retrieval and information science."[49] But this is not an undifferentiated unity: it constitutes a psychophysical unity of immaterial realities and physical instruments in which two great halves interact to create the integrated unity of one great whole. "Information science ... is not antithetical to librarianship," he says.[50] They are children of the same parents: so, why don't they love one another? The reasons are many and complex, but one of them is surely the twentieth-century librarian's lop-sided devotion to the assumptions and methods of science. "We need not be surprised," Shera observes, that the prewar "librarians rushed to embrace science and began to talk glibly of library science, turning their backs on the library's humanistic origins;" and the postwar "librarians even went so far as to evolve a new

discipline called information science."[51] This trip from humanism to science to library science to information science is problematic, he says, because librarianship "is not, and never has been, a scientific enterprise."[52] It has a great deal of use for science, of course. Which is precisely Shera's point: science in librarianship is an instrument for the use of librarians in pursuing their goals and performing their functions.

> Information science can provide the librarian with ... important and useful tools to expedite library services, but the ability to communicate a message with incredible speed over long distances through the use of glass fiber bundles or laser beams or to store vast quantities of recorded knowledge in computerlike mechanisms does not in any way alter the purpose of the library.... The social purpose of the library remains unchanged--to bring the human mind and the graphic record together.... Administration, management, architecture, and many other disciplines can contribute to the effectiveness of the library, but they are not librarianship.... The hard core of librarianship remains basically as it has always been ..., mastery of the substantive content of graphic records.[53]

The question facing librarians today, to summarize Shera's thought thus far, is not: "Is science relevant to librarianship?" The question is: "What kind of relevance does science have for librarianship?" And the answer is that science must play an instrumental role in subserving the functions and purposes of the library profession. Science can help librarians with their communicative tooling, in other words; but that's all it can do for them, because science belongs in the toolbox--not in the driver's seat--of librarianship. Shera worried about that precarious relationship, lest his experience with the take-over mentality of tough-minded documentalists at Reserve become generalized throughout the profession. The paradox of this relationship is that the librarians, who should be in the driver's seat, want to be in the toolbox, whereas the information scientists, who ought to be in the toolbox, want to be in the driver's seat. Information science has never accepted its proper instrumental status in librarianship. It therefore rejects even the slightest hint of an ancillary role for science and asserts the scientific doctrine that knowledge is power as a means of subordinating librarianship to its own functions and purposes. The result is a power struggle, much like the microcosm at Reserve, in which there are no Jesse Sheras around to prevent the take-over. Information science has therefore emerged victorious, and librarianship has been subjected to the indiscriminate pursuit of scientific objectives for their own sake. Librarianship is currently selling out to information science; and the librarians are fast forgetting, if they have not already forgotten, that "science is (merely) a subculture among subcultures,"[54] that it is only one way of thinking about the world, and that there are indeed other ways of thinking and other things to think about.

It was librarians, Shera reminds us, who "eagerly seized information science as potential supports to their ... professionalism."[55] But information science, he says, has "misinterpreted Shannon and Weaver's specialized use of the noun information and

assumed that it related to the communication of knowledge rather than the transmission of signals."[56] Shannon, as a matter of fact, was interested solely in creating a theory of physical signals. Thus, the theory he created was neither a theory of information nor a theory of communication: it was a technological theory of the physical means by which information is communicated. "Shannon specifically disavowed any pertinence of his mathematical ... theory ... for human communication," and Wiener did the same with information theory.[57] It is therefore no accident that information theory "was never quite applicable to human communication systems," because Shannon, who intentionally excluded the human communicator from his mathematical model of communication, "made ... assumptions [about the mechanical senders and receivers of information] that are not ... tenable for human systems."[58] Those assumptions stem from the mathematical concept of information invented by telephone engineers. "It is not ... information as we usually understand it," says Miller, who always uses the word "in the technical sense first suggested by Hartley ... and later developed by Shannon." Information in the technical sense refers to "the degrees of freedom that exist [for a mechanical system] ... to choose among signals, symbols, messages, or patterns to be transmitted."[59] The physical symbol, in other words, has no symbolic referent in Hartley's technical concept of information, which "relates only to the signs themselves and does not relate to what they 'mean'." Hartley thus defined information, like Shannon and others who followed him, as the mechanical transmitter's "successive selection of signs, rejecting all meaning as a mere subjective factor" and insisting that "the signs must not be confused with the things they 'stand for.'"[60] This way of thinking about information has nothing in common with thinking about ideas. It was originally conceived in completely physical terms by Hartley, who, "in estimating the capacity of the physical system to transmit [what he called] information," argued that "we should ignore the question of interpretation," because "by this means the psychological factors ... are eliminated and it becomes possible to set up a definite quantitative measure of information based on physical considerations alone."[61] That is exactly what happened with the rise of information theory: information as the invisible structure of thought suddenly became information as the observable functions of matter and energy; and a word was no longer an abstraction with meaning, but "an acoustic or electrical disturbance."[62] This is the technical concept of information originated by Hartley, developed by Shannon and Wiener, and refined by McGill and Ashby.[63] "It is a pity," laments Colin Cherry, "that the mathematical concepts stemming from Hartley have been called 'information' at all."[64] That is precisely what reduces the study of ideas to action theory: thought becomes process so scientists can live with it. By and large, today's information professionals are philosophical materialists who define information as "a property of data ... produced by a process that produced the data." Their physical thinking is transparent and complete, for the information process may be data transmission, data selection, data organization,

or data analysis.[65] But data it must be, one way or another, or it isn't information. The whole thing, says Shera, results from "an unfortunate use of terminology."[66] Information theorists currently use the term information "in a sense that has so little to do with any traditional or metaphoric meanings of the word that one can only wonder why the scientific community has allowed it to continue:" their reckless use of "information as an alias for signal transmission ... has been infelicitous, misleading, and disserviceable, and ... frequent attempts to correct this [deplorable] state of terminological affairs have been unsuccessful."[67] Once Shannon's theory was firmly established, the almost mystical appeal of "information" became so attractive as to be well-nigh irresistible. "Everybody tried to get into the act" by applying his magic theory "to a wide range of disciplines" in "an intellectual get-rich-quick scheme" that could only end in the bankruptcy of confusion which characterizes our thinking about information today.[68] "This extension of information theory ... to other quite different fields [than engineering] has been a methodological disaster."[69] The reductionist tendency of hard-core science, meanwhile, acknowledges no essential difference between data and ideas because it despises dichotomies and dualisms derived from the mind-body problem of philosophy. The resulting monistic "confusion between data and ideas," which regards data as ideas, "leads to the confusion between data systems and idea systems" that befuddles the information community today.[70] "This confusion of ideas with data," says Shera, "can be dispelled only by distinguishing between data systems and idea systems"[71]--a distinction the monistic materialists are unwilling to make. "Our so-called information systems," he says, "are actually nothing but data systems,"[72] because they only "map the flow of data to or from humans or machines"[73] and cannot effect the transfer of ideas from one mind to another. Shera is here taking cues from Lee Thayer, an important communications theorist of the sort found in departments of communication. According to Thayer, if any of the objects or processes in the physical universe fall "within the limited range of our sensory equipment (with or without amplification or translation by some technological device)," those objects or processes "are ... potential data for us."[74] These data, furthermore, must be carefully distinguished from information.

> Information, not data, is the raw material for thinking.... If someone says something to you ..., that person's utterance is ... data.... Your sensory equipment translates the physical data of his speech [sounds] ... into ... neurological data. This neurological data is then ... converted into ... information. What your friend is actually producing--physical sound waves--is now meaningful to you in the form of consumable ... messages....
>
> In ... systems engineering and information ... sciences, ... 'data' and 'information' are used interchangeably. But it is very useful ... to distinguish between that which is potentially available ... [to human beings as] data ... and that which is immediately consumable ... [by human beings as] information.... Underlying all communication is the process of ... converting raw sensory data into functionally-consumable ... information.... It is indispensable to our understanding of human communication ... to recognize this crucial difference between 'data' and 'information.'[75]

Thayer is speaking here about the human communication of thought, not about the electronic or mechanical manipulation of data. That poses a fundamental problem for librarians: they will have to decide, it seems, if they are interested primarily in the communication of knowledge-as-ideas (for which the controlled manipulation of data is instrumentation), or if they are solely concerned with the technology of communication. There is no question about the choice Shera would have us make. The information scientists, he says, are "aligning themselves with the natural sciences, which deal with physical phenomena,"[76] whereas "librarians ... [deal] only incidentally with ... [phenomena] but primarily with ideas, concepts, and thoughts.... The idea, not the process, is our primary concern."[77] Scientific theory "can be successfully applied to all technical problems concerning information;" but scientists "are in no position to investigate the process of thought," and they cannot entertain any theory "involving the human value of ... information. This elimination of the human element," we are told, "is the price we have to ... pay for ... scientific knowledge."[78] That price, Shera finds, is much too high. The human element cannot be eliminated from librarianship, which "is much closer to the humanities than to the 'hard' sciences."[79] The enthusiasm of his followers notwithstanding, Shannon's mechanistic assumptions about communications technology have severely limited the potential of information theory. Its purpose is to create a physical system which functions as the means of providing access to ideas; but the design, production, implementation, and control of the system get all of its attention. The schools of librarianship and information science are therefore turning out "control artists"--the data mechanics who tinker with information systems but stumble over the access problem because they can't control ideas. Thayer has explained the reason for all that by distinguishing between (1) communication and (2) communication systems.

> ... Information systems ... are actually data-transportation and data-processing systems. Their informational value is determined by ... their data outputs [only as those outputs] are converted into information consumable by [people]....
>
> Even the most elaborate data systems do not guarantee that ... intended communication will occur.... There is no data-handling procedure or electronic equipment which can obviate the fact that communication occurs only in people, not in the transportation or in the mechanical or electronic processing of data.... Communication does not occur in the ... data. Communication ... occurs [only] <u>within</u> a consumer of the system's outputs, not in the system which transports data to him. Nor ... is there any significance or meaning or utility in the data.... Communication ... is a property of the consumer and the data flow combined--not of the data flow itself.[80]

In the last years of his life, Shera was deeply interested in issues like these. "The general information problem has three aspect ," he told this writer in the early eighties, "and we have addressed only two of them." We have publicized <u>the sheer volume of information</u> as the now familiar knowledge explosion; and we have seemingly talked forever about the fantastic growth in communications technology; but we have

neglected the increasing involvement of the twentieth century with symbolism, which is the basic cause of the knowledge explosion--the reason for both the imposing volume of information and the unprecedented growth of communications technology. The information professionals have tried to deal scientifically with information by reducing symbolism to physical symbols-as-data in the form of printed characters (visible squiggles on paper), speech sounds (audible wrinkles in the atmosphere), or electro-chemical impulses (the circuitry of our nervous systems and computers). But information clearly transcends the data by means of which it is expressed. For every symbol in the physical environment of the natural universe, in other words, there is a symbolic referent in the intellectual environment of the cultural universe. The symbol and the symbolic referent thus belong to completely different orders of reality--which means that the symbolic process of information cannot be understood in the absence of a dualistic theory that explains exactly how symbols and symbolic referents are wired up to each other and to human beings.[81]

Which brings us to the last proposition offered by Shera to the library profession. "I submit," he says, "that librarians must look to 'symbolic interactionism' for the proper foundation of a theory of librarianship."[82] Systems theory is the scientific way of accounting for the technical aspects of communication systems; it does not account for human communication. But symbolic interactionism, which "refers to the [psychophysical] process by which people relate to their own minds and the minds of others,"[83] is a very real alternative to systems theory, an alternative which provides the humanistic account of communication. It was created by George Herbert Mead, who rejected the study of social phenomena by mechanistic methods brought into sociology from physics but apparently despaired of doing anything about it outside of the classroom. When Mead died virtually unpublished in the early thirties, however, several of his books were published posthumously by his former students. His influence, which has grown steadily ever since, underlies the essentially humanistic thinking of communication theorists like Thayer. George Herbert Mead has thus arisen from the dead to plague the scientific sociologists for aping the manners of physics and assuming the identity of natural and social phenomena in their researches. The social order, unlike the natural order, is an ontological dualism constituted by (1) an empirical social order, which consists of people as behavers who do things, and (2) an ideative social order, which consists of people as thinkers who know things. Humanists regard the empirical social order as the only means of access to the ideative social order, whereas scientists treat the ideative social order as nonexistent and regard the empirical social order as a subset of the natural order. Science, that is to say, studies the behavior of human beings without reference to their minds; but humanism studies man's behavior as the means of access to his mind. Systems theory thus concentrates perforce on the behavioral aspects of communication without considering its ideative aspects. Symbolic interactionism,

however, investigates the psychophysical interaction of the empirical order and the ideative order in human beings by studying the relationship between the physical symbol and its symbolic referent. It regards human interaction as essentially social and symbolic, for "nearly every movement, sound, odor, or touch of another human being acts as a symbol which we learn to interpret" by attaching subjective meanings to it.[84] This clarifies the informational function of physical symbols-as-data in communication: the meanings we see in the data are in us, not in the data. We create symbolism by attaching subjective meanings to data and using them as instruments of communication; and communication is impossible unless the data are made to function instrumentally (and invisibly) as symbolic signs: they must present ideas to the mind without getting in the way. Symbolic interactionism, says Shera, "reminds librarians that their area of concern is based on social phenomena," not on natural phenomena.[85] And we need reminding. We live in a day when scientific philosophies of humanism are fashionable; but everybody gets nervous when someone like George Herbert Mead or Karl Popper comes up with provocative and seminal ideas based on a humanistic philosophy of science. "We librarians," Shera says, "must constantly remind ourselves that our concern is with sociological and psychological phenomena, not [with] physical objects and processes."[86]

> ... The library looks in two directions simultaneously. It looks toward the social sciences, because it is a creature of society.... But the library is also humanistic in that its characteristics, [its] modes of access to its resources, [its] uses, and [its] values are humanistic.[87]

It is impossible, as a matter of fact, to imagine anything more thoroughly humanistic than librarianship. But librarianship is currently being dehumanized by information science, with its strong empirical emphasis on physical symbols and its corresponding inability to manage the intellectual realities of symbolic referents. Librarians have traditionally confused communication with the behavior of physical symbols; but the postwar librarians have pushed that confusion to its ultimate limits: they can't tell the difference anymore between information science, which is based on the controlled manipulation of data, and librarianship, which is based on the intersubjective communication of ideas. There are thus <u>two</u> theoretical perspectives on the realities of communication, for systems theory and symbolic interactionism are not merely rival theories of communication: they are theoretical <u>perspectives</u> which constitute radically different approaches to the whole problem of theorizing about communication. The scientific and humanistic perspectives thus constitute the necessary dipoles of communication theory which serve as the general orientations for all possible theories of communication. Every theory of communication known to date is built on one of these two perspectives or is a combination of both. It is abundantly clear, therefore that general systems theory, which deals with physical symbols, can never replace symbolic interactionism, which deals with the psychophysical <u>interaction</u>

of physical symbols with their ideative referents.

The new technology, Shera thinks, is to be used for the librarian's purposes, not for the purposes of its designers or manufacturers, and certainly not for its own purposes. A Cadillac is a sophisticated piece of equipment; but it cannot tell librarians whether they should go to Chicago or not or when to turn off the freeway. Those prerogatives belong to the librarians, and they must not forfeit them to others. Shera is worried, it seems, about the take-over mentality of the information scientists. "The great danger with which information science threatens librarianship," he warns, "is ... loss of control of the profession to other and less competent hands. Of the dangers inherent in this threat," he adds, "we do not now seem to be fully aware."[88] The information scientists must not interfere with the library's reason for being, which is the provision of knowledge service based on the interpretion of ideas. "It is here," says Shera, "that information science reveals its greatest threat of dehumanizing the library's function."[89] Shera has consistently warned librarians "against becoming 'punch-drunk from ... [technology].'"[90] We are in serious trouble if the means of doing our job becomes the job we are doing. "The basic purpose of librarianship is not encompassed in the machine, and there is much more to librarianship than ... information science."[91]

> The new technology, the brightly shining new machines with their spinning reels of tape, [and] the finely spun theories of information science are but means to an end. They can do no more than increase ... accessibility to recorded knowledge.[92]

There are bad things in store, Shera feels, "if we permit ourselves to be mesmerized by the gadget" or to "accept the flickering image of data on a fluorescent screen as knowledge."[93] Popper was right: the computer, even with its shimmering images, is only "a glorified pencil" after all.[94]

Einstein said once, "My pencil is sharper than I am."[95] Einstein with a pencil was a lot smarter than Einstein without a pencil, there's no doubt about that. But even our pencils can get out of hand--if we let them go to our heads. They are like the sorcerer's broom. I remember vaguely, from somewhere in my childhood, the story of a boy about my age who was apprenticed to a sorcerer. One day, when he was alone in the shop, the boy managed to bewitch the sorcerer's broom into doing his work for him by fetching water to fill a cistern. He was elated by what he got the broom to do until he tried to stop it because the cistern was full and discovered that he couldn't unbewitch it. He chopped the broom in half with an axe in order to stop it, but the halves became two brooms and carried twice as much water to the cistern as before. So, the boy had to swim for his life or perish in the flood he caused and couldn't stop. And the moral of that story is precisely Shera's point: our glorified pencil "must be kept in its proper place as a tool and a slave, or we will become sorcerer's apprentices, with data data everywhere and not a thought to think."[96]

NOTES: Shera as a Bridge Over Troubled Waters

[1]Fritz Machlup and Una Mansfield, eds., The Study of Information: Interdisciplinary Messages (New York: John Wiley & Sons, 1983), 385.

[2]From a tape-recorded interview of Jesse Shera by Ruth Helmuth in 1970. Henceforth cited as the Helmuth Interview (1970).

[3]Alan Rees, "Jesse H. Shera: a Reminiscence," Information, March-April, 1971, 105.

[4]C. H. Cramer, The School of Library Science at Case Western Reserve University, 1904-1979 (Cleveland, Ohio: Case Western Reserve University, 1979), 95.

[5]Rees, "Shera," 107.

[6]Cramer, School of Library Science, 93.

[7]Rees, "Shera," 105.

[8]Conrad H. Rawski, "SHERA, Jesse Hauk," a ms. to be included in vol. 38 of the forthcoming revision of the Encyclopedia of Library and Information Science (New York: Marcel Dekker, 1984?).

[9]Rees, "Shera," 106.

[10]Interview of Alan M. Rees by H. Curtis Wright, 26 August 1983.

[11]Rees, "Shera," 106.

[12]Cramer, School of Library Science, 99.

[13]Helmuth Interview (1970).

[14]Interview of John C. Millis by W. K. Cawley, 27 June 1983.

[15]From a tape-recorded interview of Jesse Shera by Mrs. Gerald H. Ruderman in 1968. Henceforth cited as the Ruderman Interview (1968).

[16]Helmuth Interview (1970).

[17]Ruderman Interview (1968).

[18]Ibid.

[19]Jesse H. Shera, "Developments in Machine Literature Searching," in his Documentation and the Organization of Knowledge, ed. D. J. Foskett (Hamden, Conn.: Archon Books, 1966), 105-106. Italics mine.

[20]Ruderman Interview (1968).

[21]Ibid.

[22]Ibid.

[23]Helmuth Interview (1970).

[24]Interview of Rees by Wright, 26 August 1983.

[25]From one of several informants who do not wish to be identified. I shall henceforth paraphrase their information without citing it, or cite them as an Anonymous Informant.

[26]Interview of Rees by Wright, 26 August 1983.

[27]Rees, "Shera," 107.

[28]Ibid., adding that there was only "a limited test of the performance of the WRU System ... by Cyril Cleverdon in 1962." See Aslib. Cranfield Research Project. A Report on a Test of the Index of Metallurgical Literature of Western Reserve University, by Jean Aitchison and Cyril Cleverdon (Cranfield, Eng.: College of Aeronautics, 1963).

[29]Rees, "Shera," 107. Italics mine.

[30]Interview of Rees by Wright, 26 August 1983, adding that "the school turned inward," because "it was no longer the focus of national and international interest."

[31]Rees, "Shera," 107.

[32]Helmuth Interview (1970).

[33]Ibid.

[34]Jesse H. Shera, "Librarianship and Information Science," in Machlup and Mansfield, eds., The Study of Information, 379.

[35]Ibid., 381.

[36]Ibid., 380.

[37]Ibid., 381.

[38]Ibid., 385.

[39]Abraham Flexner, "Is Social Work a Profession?" School and Society, 1 (1915), 902-903, adding that even "the execution or application of a well thought-out technique ... is, after all routine; someone back of the routineer has done the [professional] thinking ..., and he alone deserves to be considered professional."

[40]Shera, "Librarianship and Information Science," 386. On the dozens of other names for information science, see Machlup and Mansfield, eds., The Study of Information, 6-7.

[41]Shera, "Librarianship and Information Science," 383.

[42]W. K. C. Guthrie, The Greek Philosophers from Thales to Aristotle (New York: Haprer and Row, 1960), 9.

[43]Ibid., 10.

[44]Cf. ibid., 108-109: "The proper performance of function depends on structure.... Everything has its proper ergon [function]... Therefore everything has its proper arete [technique], ... the condition in which it can best perform its ergon."

[45]Ibid., 72.

[46]Shera, "Librarianship and Information Science," 384-85.

[47]Ibid., 385.

[48]Ibid., 379, 385.

[49]Rees, "Shera," 107.

[50]Jesse H. Shera, "Of Librarianship, Documentation, and Information Science," UNESCO Bulletin for Libraries, 22 (1968), 65.

[51]Shera, "Librarianship and Information Science," 383.

[52]Ibid., 385. Cf. his negative review of Lloyd Houser and Alvin M. Schrader, The Search for a Scientific Profession; Library Education in the U.S. and Canada (Metuchen, N.J.: Scarecrow Press, 1977), Library Quarterly, 49 (1979), 310-16. The review is negative because Shera regards the search itself as misconceived.

[53]Shera, "Librarianship and Information Science," 387.

[54]Kenneth E. Boulding, The Image (Ann Arbor, Mich.: Univ. of Michigan Press, 1959), 16. Cf. also the rather devastating criticism of the extreme subjectivity of science in his Economics as a Science (New York: McGraw-Hill, 1970), 117-22.

[55]Shera, "Librarianship and Information Science," 384, adding that "science does not a profession make, and an overlay of scientific operations is not a sine qua non for professionalism." Italics his.

[56]Ibid., 383.

[57]Lee Thayer, Communication and Communication Systems ... (Homewood, Ill.: Richard D. Irwin, 1968), 189.

[58]D. J. Darnell, "Information Theory: an Approach to Human Communication," in R. W. Budd and B. D. Ruben, eds., Interdisciplinary Approaches to Human Communication (Rochelle Park, N.J.: Hayden Book Co., 1979), 158. Shannon's assumptions are discussed in ibid., 160-61. On his exclusion of the human communicator, see R. L. Ackoff and F. E. Emery, On Purposeful Systems (Chicago: Aldine-Atherton, 1972), 11.

[59]J. G. Miller, Living Systems (New York: McGraw-Hill, 1978), 11. This magnum opus answers every question anyone can reasonably ask about systems theory. It is relevant to the study of communication systems, but is largely irrelevant to the study of human communications. It has been negatively reviewed by Talcott Parsons, "Concrete Systems and 'Abstracted' Systems," Behavioral Science, 25 (1980), 46-55, because "it plays down or conceals the one issue that matters most: the difference between information in a metaphoric sense where no minds and no cognitive processes are involved, and information in the original and traditional sense where meaningful perceptions and thoughts reach a mind that receives and interprets them," Machlup and Mansfield, eds., The Study of Information, 655. The technical concept of information is stated baldly by Miller, Living Systems, 1030: "Information is the patterning of matter-energy in systems."

[60]Colin Cherry, On Human Communication: a Review, a Survey, and a Criticism (3d ed.; Cambridge, Mass.: MIT Press, 1978), 50-51.

[61]R. V. L. Hartley, "Transmission of Information," Bell System Technical Journal, 7 (1928), 538. This kind of physical thinking pervades the entire article.

[62]Ibid., 582, adding that "such functions are also typical of other modes of communication."

[63]See G. Brockstra, "On the Foundations of GIT ...," Cybernetics and Systems, 11-12.

[64]Cherry, On Human Communication, 51.

[65]Robert M. Hayes, "Information Science Education," in R. Wedgeworth, ed., ALA World Encyclopedia of Library and Information Services (Chicago: ALA, 1980), 249. This encyclopedia is henceforth cited as WELIS. For another of Hayes' process-oriented def-

initions of information as data, see R. M. Hayes and J. Becker, Handbook of Data Processing for Libraries ... (New York: Becker and Hayes, 1970), 745-47, which I have already opposed in H. Curtis Wright, The Oral Antecedents of Greek Librarianship (Provo, Utah: Brigham Young University Press, 1978), xvi-xvii.

[66]Shera, "Of Librarianship, Documentation, and Information Science," 62.

[67]Machlup and Mansfield, eds., The Study of Information, 658.

[68]Jesse H. Shera and Donald B. Cleveland, "History and Foundations of Information Science," Annual Review of Information Science and Technology, 12 (1977), 261.

[69]Machlup and Mansfield, eds., The Study of Information, 56.

[70]Shera, "Librarianship and Information Science," 384.

[71]Ibid., 386.

[72]Ibid., 384.

[73]Thayer, Communication and Communication Systems, 116. Italics his.

[74]Ibid., 38.

[75]Ibid., 29-30. Italics mine.

[76]Jesse H. Shera, "Philosophy of Librarianship," in WELIS, 316.

[77]Shera, "Librarianship and Information Science," 384, 387.

[78]Leon Brillouin, Science and Information Theory (2d ed.; New York: Academic Press, 1963), x.

[79]Shera, "Philosophy of Librarianship," 316.

[80]Thayer, Communication and Communication Systems, 115. Italics his.

[81]This is the "jist," as near as I can remember it, of my telephone conversations with Shera in the early eighties. His ideas and mine are all mixed up together here, and I'm not sure exactly which of us is responsible for what. But this gives the general drift of our conversations--which were pretty serious and very deep, I might add.

[82]Shera, "Librarianship and Information Science," 386.

[83]Ibid.

[84]James P. Spradley, ed., Culture and Cognition ... (San Francisco: Chandler, 1972), 16.

[85]Shera, "Librarianship and Information Science," 387.

[86]Ibid., 386.

[87]Ibid., 385.

[88]Ibid., 387.

[89]Ibid.

[90]Shera and Cleveland, "History and Foundations of Information Science," 259.

[91]Shera, "Librarianship and Information Science," 387.

[92]Jesse H. Shera, "Documentation into Information Science," in William E. Hug, ed., Strategies for Change in Information Programs (New York: Bowker, 1974), 285.

[93]Shera, "Librarianship and Information Science," 387.

[94]Karl R. Popper and John C. Eccles, The Self and its Brain (New York: Springer-Verlag, 1981), 208, where Popper's translation is "my pencil is cleverer than I."

[95]Ibid.

[96]Shera, "Librarianship and Information Science," 384.